- **Importance:** of an interaction is related to
  - Significance or an assessment of probable consequences of anticipated ~~impacts~~ interactions
    - Assignment of numerical value from 1 to 10 (10 for very important interaction, 1 for an interaction of relatively low importance)
    - Assignment of numerical (importance) value is based on the subjective judgment of individual, small group, or interdisciplinary team working on environmental assessment study

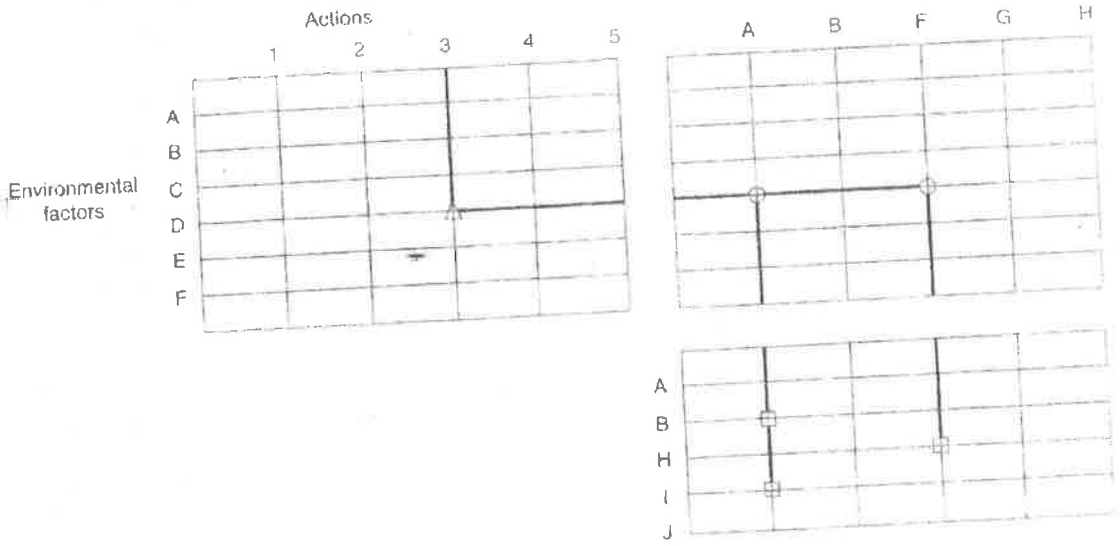
LEOPOLD MATRIX: ADVANTAGES

- Leopold matrix is flexible (expanded or contracted)
  - Number of actions can be increased or decreased from the total 100
  - Similarly, number of environmental factors can be increased or decreased from about 90
- Useful as a gross screening tool for identification of impact .
- Valuable means for impact communication by providing a visual display of the impacted items and of the major actions causing impacts
- Summation of the number of rows and columns designated as having interactions can offer insight into impact assessment and interpretation .
- Identification of beneficial as well as detrimental impacts through the use of appropriate designators e.g. plus and minus
- Identification of impacts at various temporal phases of the project e.g. (can also be used for and describe impacts)
  - Construction,
  - Operation, and
  - Post construction. phase

  With various spatial boundaries namely
  - At site, and
  - In the region

STEPPED MATRIX

- Also called as cross-impact matrix
- Addresses secondary and tertiary impacts of initiating actions
- Environmental factors are displayed against other environmental factors
- Consequences of initial changes in some factors on other factors can be displayed
- Facilitate the tracing of impacts and the recognition of the environment as a system



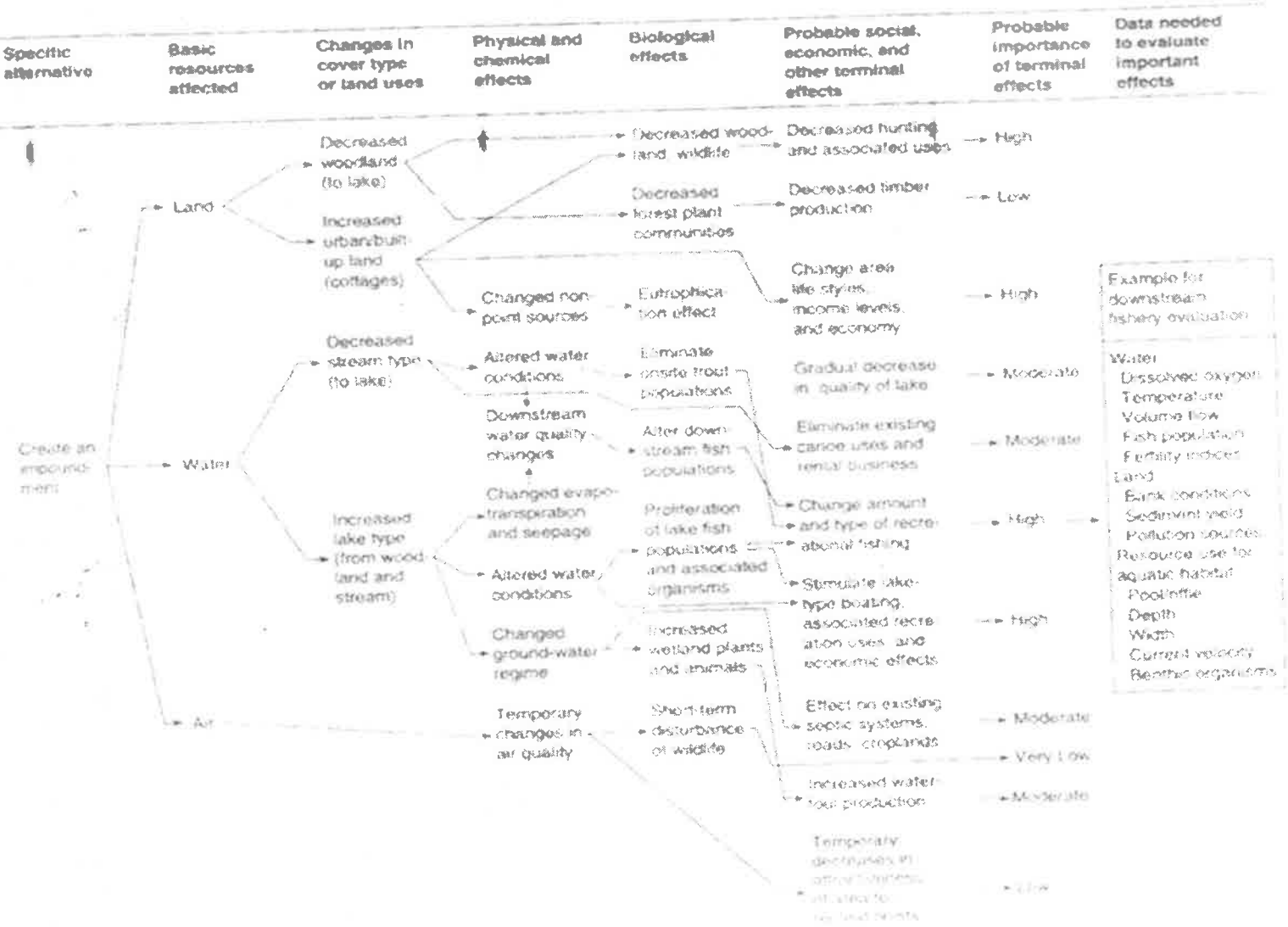
NETWORKS

- Networks integrate cause and consequences through identifying interrelationships between causal actions and the affected environmental factors
- Useful for identifying anticipated impacts associated with potential projects
- Aid in organizing the discussion of anticipated project impacts
- Facilitate communicating information about an environmental impact study
- Digraphs may also be used

  Directed graph showing relationship between biophysical and socio-economic systems

- Networks integrate cause and consequence through identifying relationship b/w casual actions and affected env factors
- useful for identifying impacts associated with potential projects
- facilitates communicating information about an env impact study.
- Digraphs may also be used.
  Directed graph showing relationship b/w biophysical and socio economic systems.

NETWORK FOR ANALYZING PROBABLE ENVIRONMENTAL IMPACTS OF AN IMPOUNDMENT PROJECTS



NETWORK DIAGRAM FOR A DREDGING PROJECT

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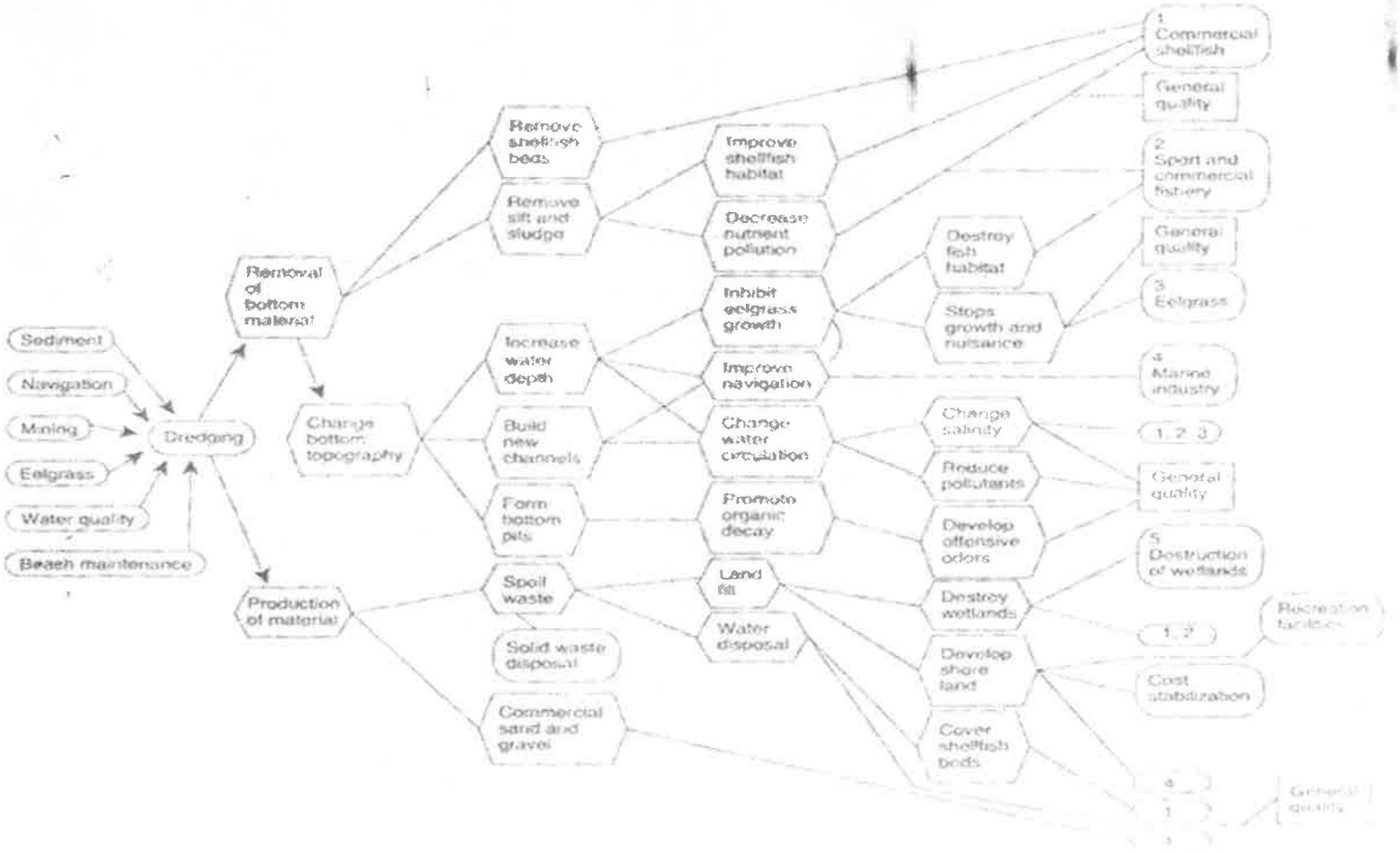
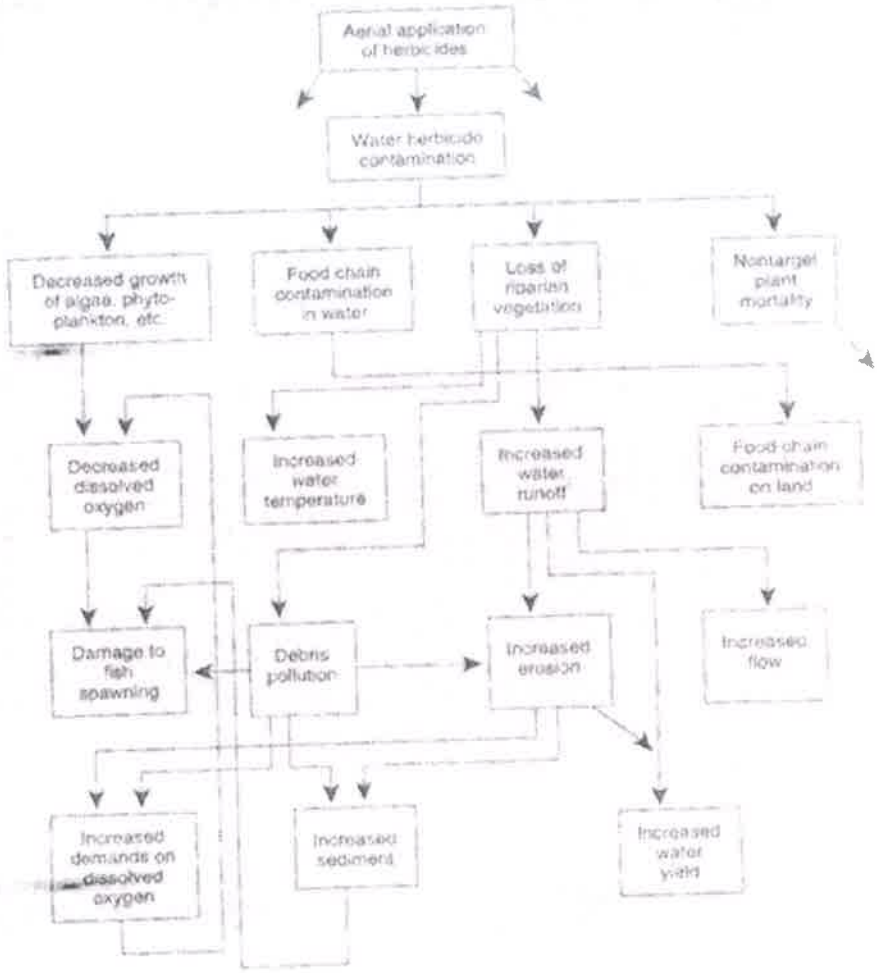
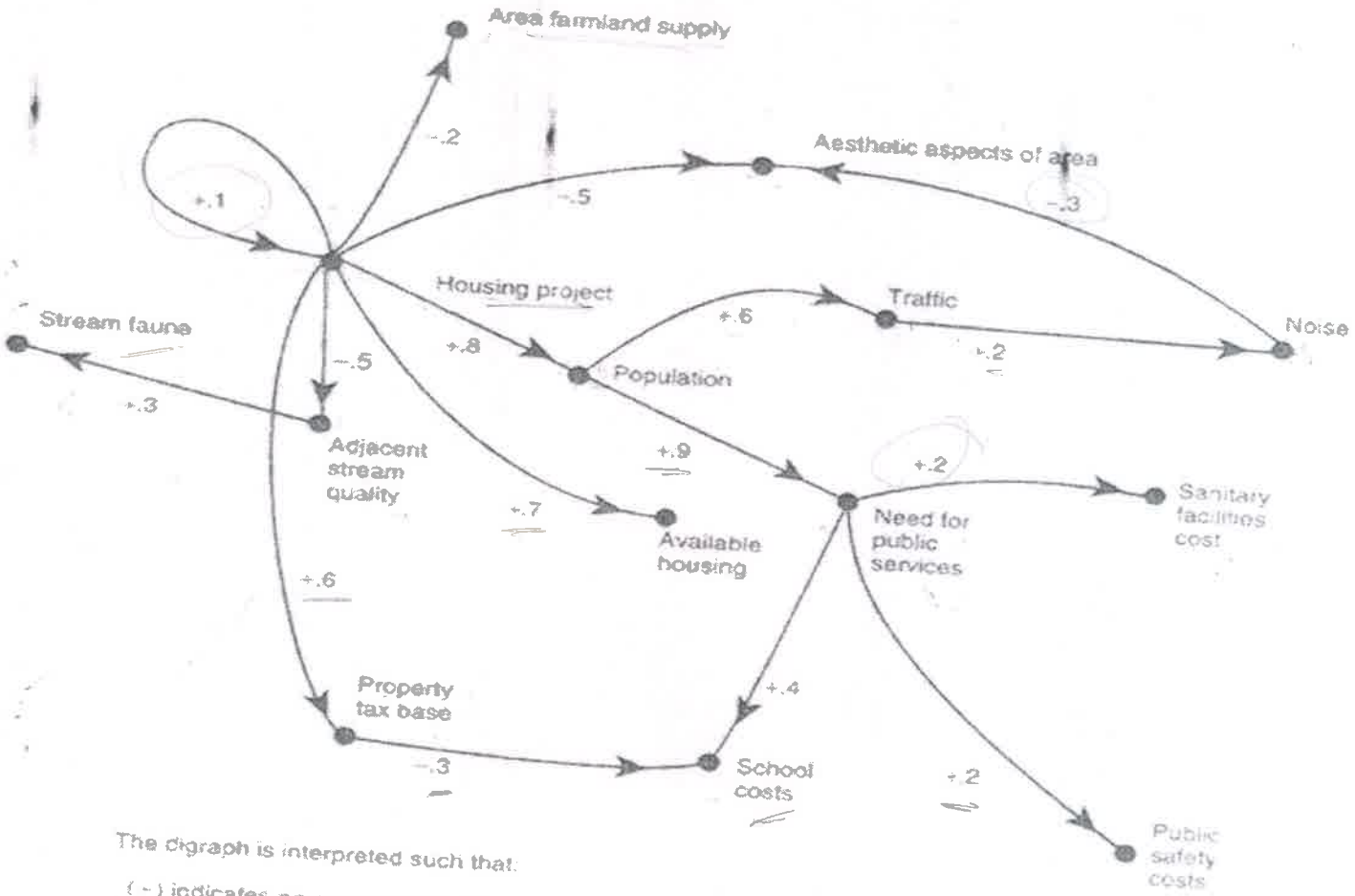


A SECTION OF IMPACT TREE



DIRECTED GRAPH (DIGRAPH) OF PRIMARY IMPACTS OF A RESIDENTIAL HOUSING PROJECT



The digraph is interpreted such that:

(+) indicates an augmenting effect; i.e., an increase in vertex factor *x* leads to an increase in vertex factor *y*, and a decrease in *x* leads to a decrease in *y*.

(−) indicates an inhibiting effect; i.e., an increase in *x* leads to a decrease in *y*, and a decrease in *x* leads to an increase in *y*.

CHECKLISTS

- Checklists range from listing of environmental factors to highly structured approaches involving importance weightings for factors and the application of scaling techniques for the impacts of each alternative on each factor
- Simple checklists – list of environmental factors
- Descriptive checklists – list of factors alongwith information on measurement and impact prediction and assessment
- Based on questionnaires
- Published agency checklists and/or project specific checklists represent the collective professional knowledge and judgment – hence they have credibility and usability
- Checklists can be easily modified to make them more pertinent to particular project types in given locations

OVERLAY TECHNIQUES

- A technique used in spatial planning
- Based on use of a series of maps depicting environmental factors and land features
- Effective in selecting alternatives and identifying certain types of impacts
- GIS (geographic information system) now being used as layered overlay mapping technique

AD HOC APPROACH

- Involves assembling a team of specialists to identify impacts in their areas of expertise
- Used in early days i.e. immediately following enactment of NEPA
- Still used in the sense that as extant methodologies are adapted to specific needs, the results can be called ad hoc methods

बोलो जयकारा बोल मैं श्री गुरु महाराज की जय।
श्री सतगुरु देवाय नमः।

NEPA Guidelines

APPENDIX 3

BASIC CHECKLIST WHICH CAN BE USED TO COMPILE THE DESCRIPTION OF THE ENVIRONMENTAL SETTING

1. **Basic Land Conditions**

a. **Geological Conditions**

Major land formations (valleys, rivers)

Geologic structures (sub-strate, etc.)

Geologic resources (minerals, oil, etc.)

Seismic hazards (faults, liquefaction, tidal wave etc.)

Slope stability and landslide potential

b. **Soil Conditions**

Soil conservation service, classification

Hazard potential (erosion, subsidence or expansiveness)

Natural drainage rate

Sub-soil permeability

Run-off rate

Effective depth (inches)

Inherent fertility

Suitability for method of sewage disposal

c. **Archaeological value of site**

2. **Biotic Community Conditions**

a. **Plant**

General type and dominant species

Densities and distributions
Animal habitat value

Historically important specimen

Watershed value

Man-introduced species

Endangered species (location, distribution and conditions)

Fire potential (chaparral, grass, etc.)

Timber value

Specimen of scientific or aesthetic interest

b. **Animal**

General types/dominant species (mammal, fish, fowl, etc.)

Desnities and distribution

Habitat (general)

Migratory species

Game species ?

Man-introduced species (exotic species)

Endangered species

Commercially valued species

3. **Watershed Conditions**

Water quality (ground water and surface water)

Source of public or private water supply on-site

Watershed importance (on-site and surrounding area)

Flood plain importance (on-site and surrounding area)

Water run-off rate

Streamside conditions (habitat conditions and stream flow rate)

Location of wells, springs

Marshlands, lakes, ocean frontage importance

4. **Airshed Conditions**

General climatic type

Air quality

Airshed Importance

Wind hazard area (min/max speeds)

Odour levels

Noise levels

Rainfall (average)

Temperature (average highs and lows)

Prevailing winds (direction and intensity)

Fog conditions (hazard potential)

Shri Satguru Devay Namah!!

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